# G0S2 regulates innate immunity of Kawasaki disease via lncRNA RP1-28O 10.1

Mako Okabe[1], MD, Shotaro Hayakawa[6], MS, Yu Hamaguchi[6], PhD, Michiaki Hamada[6], PhD, Shinya Takarada[1], MD, Nariaki Miyao[1], MD, PhD, Hideyuki Nakaoka[1], MD, PhD, Keijiro Ibuki[1], MD, PhD, Sayaka Ozawa[1], MD, PhD, Kazuhiro Watanabe[2], MD, PhD, Harue Tsuji[3], MD, Ikuo Hashimoto[4], MD, PhD, Kiyoshi Hatasaki[5], MD, PhD, Fukiko Ichida[7], MD, PhD, and Keiichi Hirono[1*], MD, PhD

[1]Department of Pediatrics, Faculty of Medicine, University of Toyama, Toyama, Japan.

[2]Department of Pediatrics, Kurobe City Hospital, Toyama, Japan.

[3]Department of Pediatrics, Takaoka City Hospital, Toyama, Japan.

[4]Department of Pediatrics, Toyama City Hospital, Toyama, Japan.

[5]Department of Pediatrics, Toyama Prefectural Hospital, Toyama, Japan.

[6]Department of Electrical Engineering and Bioscience, Waseda University, Tokyo, Japan

[7]Department of Pediatrics, International University of Health and Welfare, Tokyo, Japan.

*Summary of manuscript*

Kawasaki disease (KD) is a systemic vasculitis that is the most common cause of acquired heart disease in children. However, the etiology of KD remains unknown. Long-

cording RNAs (lncRNA) contribute to the pathophysiology of various diseases, including myocardial infraction and cardiomyopathy. There have been few studies reporting a role for lncRNAs in KD-associated inflammation and we conducted this study to investigate whether there is a role for lncRNAs.

We enrolled 50 patients with KD and 45 controls. lncRNA expression in monocytes were determined by Cap analysis gene expression sequencing (CAGE-seq) and validated by quantitative real-time PCR. Differentially-expressed lncRNAs were further investigated to determine whether they were directly regulated by immune responses.

Twenty-one candidate lncRNA transcripts were identified by CAGE-seq as being differentially expressed during the acute phase of KD. Of the twenty-one lncRNAs, the expression level of RP1-28O10.1 was up-regulated and rapidly decreased in acute phase of KD, confirming that the expression level of RP1-28O10.1 was regulated by TLR ligand. Moreover, G0S2 was co-expressed with RP1-28O10.1 and G0S2 regulated inflammatory cytokines via RP1-28O 10.1.

We demonstrated that RP1-28O 10.1 and G0S2 interact with each other and play a pivotal role of innate immunity and inflammation during acute stage of KD.